networkMaryland

Where are we now?

IT Security & Privacy Conference

September 2004

Presenter

- Jason Ross – Director of networkMaryland for the Department of Budget and Management, OIT
- Involved with the Project since November, 2002

Overview:
What is networkMaryland?

- networkMaryland is a statewide high-speed communications backbone available throughout the State of Maryland to connect various public sector networks. It is currently focused on data transport.
- networkMaryland will provide affordable, reliable high-speed transport access throughout all areas of the State
- Intended customers:
  - **State Agencies**
  - **Higher Education**
  - **Libraries**
  - **Local and County Governments**
  - **K-12 Education**
  - **Hospitals (Proposed)**

Project Milestones

- Project Initiated - 1999
- Network Re-design - Spring 2003
- Western Maryland build out: Stage 1
  - Complete December 2003
- Western Maryland build out: Stage 2
  - Complete August 2004
- Southern MD build out – December 2004
- Annapolis build out – Complete Spring 2005
- Eastern Shore build out – Complete Spring 2005

Western MD

- Frederick PoP
  - Collocated with Frederick County Gov.
  - Provides ATM services and Sonet backbone
- Hagerstown PoP (Primary Site)
  - Collocated with other State Agencies
  - Provides ATM services, Sonet backbone and Internet presence
  - Verizon PoP for Aggregation Circuit (OC-3) and long haul back up
  - Fiber build out underway to connect Washington county government and school system

Western MD

- Hancock PoP (Washington County)
  - Sonet Backbone site
  - Future opportunity for resource share with school board
- Cumberland PoP (Allegany County)
  - ATM services and Sonet Backbone site
  - Fiber build out project underway to connect county government and school system (Allconet)
  - Provide future connectivity to far Western MD

Southern MD

- LaPlata PoP (Charles County)
  - ATM services and Sonet Backbone
  - Utilize Level3 fiber resources and possible resource share fiber for backbone connection
  - Future opportunities for serving Calvert and St. Mary's counties

Annapolis

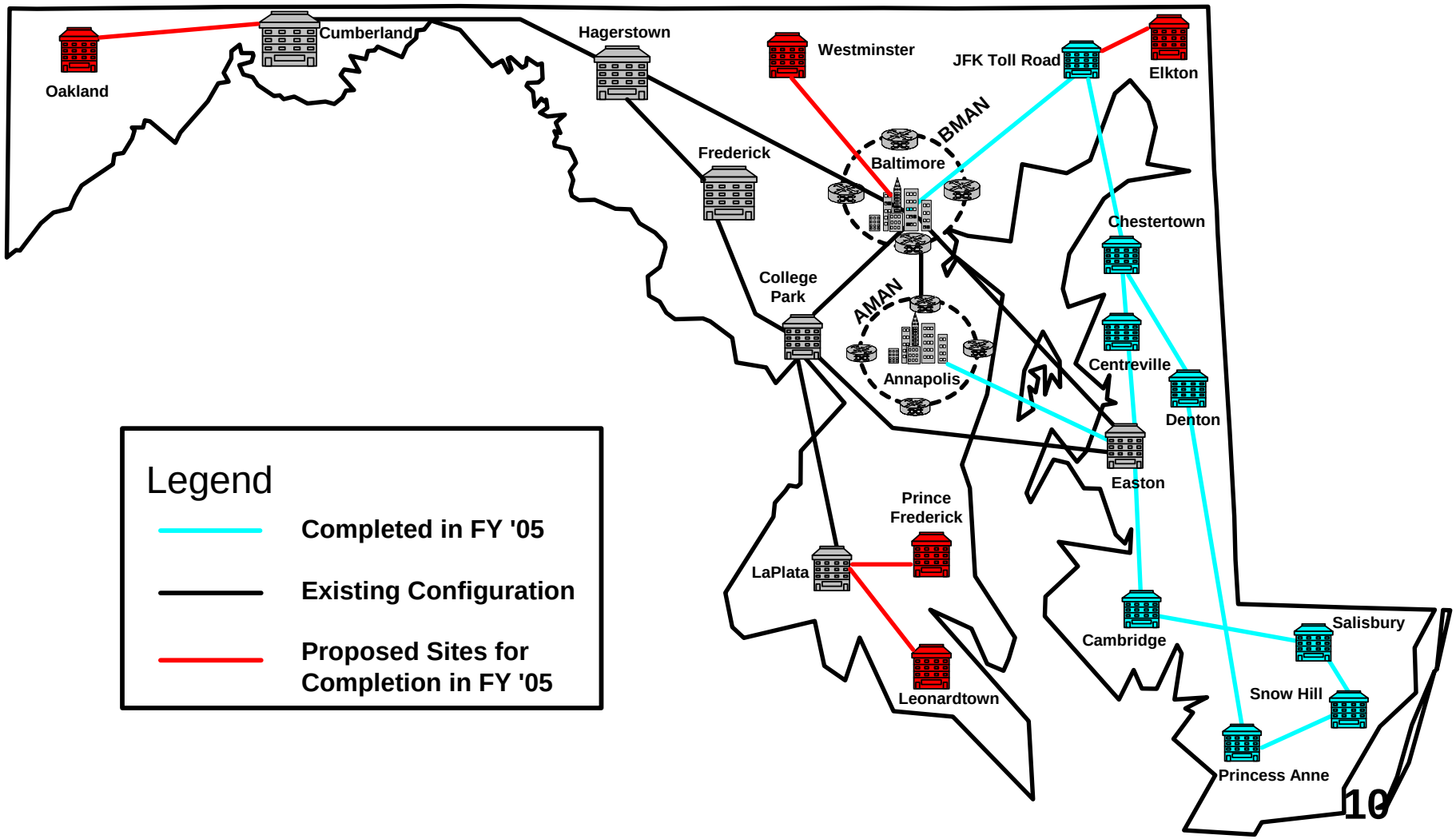
- Annapolis Data Center PoP (AMAN)
  - ATM services
  - SwGI connections to Statewide Applications
  - Building Diverse fiber paths provide reliable service and reduce leased costs
- Parole Tower
  - Sonet Backbone and Microwave services
  - Microwave backhaul for Eastern Shore Project

Eastern Shore

- Easton PoP (Primary Site)
  - ATM services and Microwave Backbone
  - Verizon PoP for Aggregation Circuit (OC-3) and long haul back up

- Eastern Shore Microwave network (OC-3)
  - Microwave presence in every county
  - Provides connection point with county networks
  - Diverse connections points to Core backbone

Geographic Map

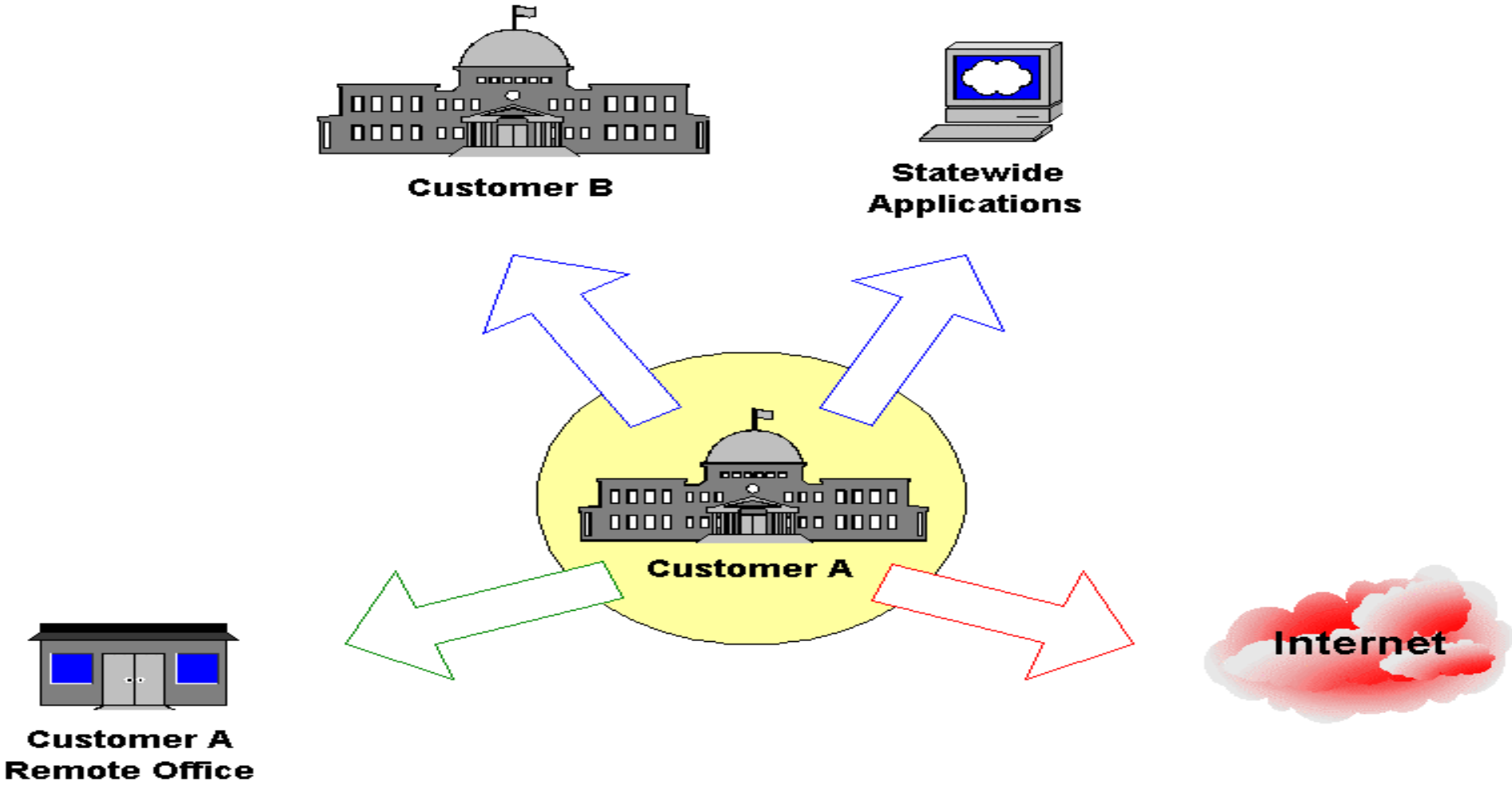


Network Design Principles

- Reduce the number of single points of failure
- Provide adequate bandwidth to support the requirements of all Public Sector Entities
- Provide high-speed connectivity into each LATA
- Multiple Internet Service Providers and Internet Gateway Routers
- Provide redundant back haul connections into each PoP
- Build fiber rings or diverse fiber routes when possible

Resulting Redundancy

- ISP Services (Sprint and Qwest) via two Juniper M20 routers located in College Park and Baltimore using BGP for load balancing and fail-over
- Diverse Sonet Ring between core PoP's in College Park and Baltimore (OC-48)
- Separate DWDM system between core PoP's in College Park and Baltimore (OC-48)
- Each TNX-1100 (Marconi) aggregation switch connects to both core ASX-4000 (Marconi) ATM switches
- Eastern and Western LATA PoP's protected by leased circuits



Agency's Business Requirements

networkMaryland Services

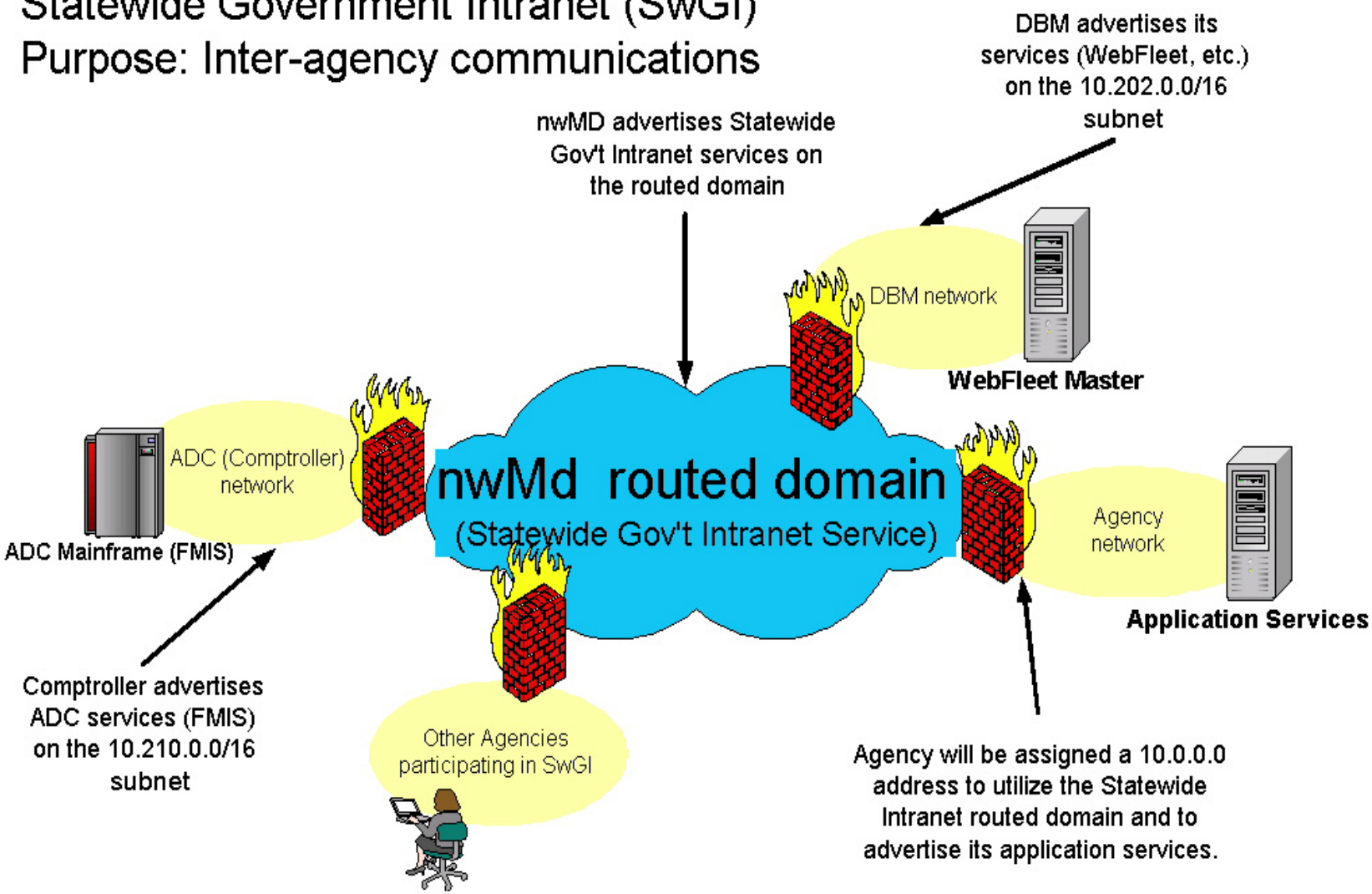
- **Private Network Services (interLATA Layer 2 or Circuit-Switched transport)**
  - supports State entities' WAN transport requirements
- **Statewide Government Intranet (SwGI)**
  - Routed network for inter- and intra-Agency communications and access to Statewide applications
- **Internet Services (ISP)**
  - provides communications access to the public Internet
  - Web Hosting

Customer Security

- Security IS the responsibility of the customer
- The Internet and Intranet must be considered equally unsecured and protected against by utilizing a firewall
- Customer Layer 2 circuits may traverse commercial networks as well, requiring VPN technology based on security requirements of the customer
- The networkMaryland team recommends a firewall with at least 4 Ethernet ports to allow for: internal LAN, DMZ Intranet and Internet connectivity
- Screening routers have become an integral part of the security model

SwGI Security

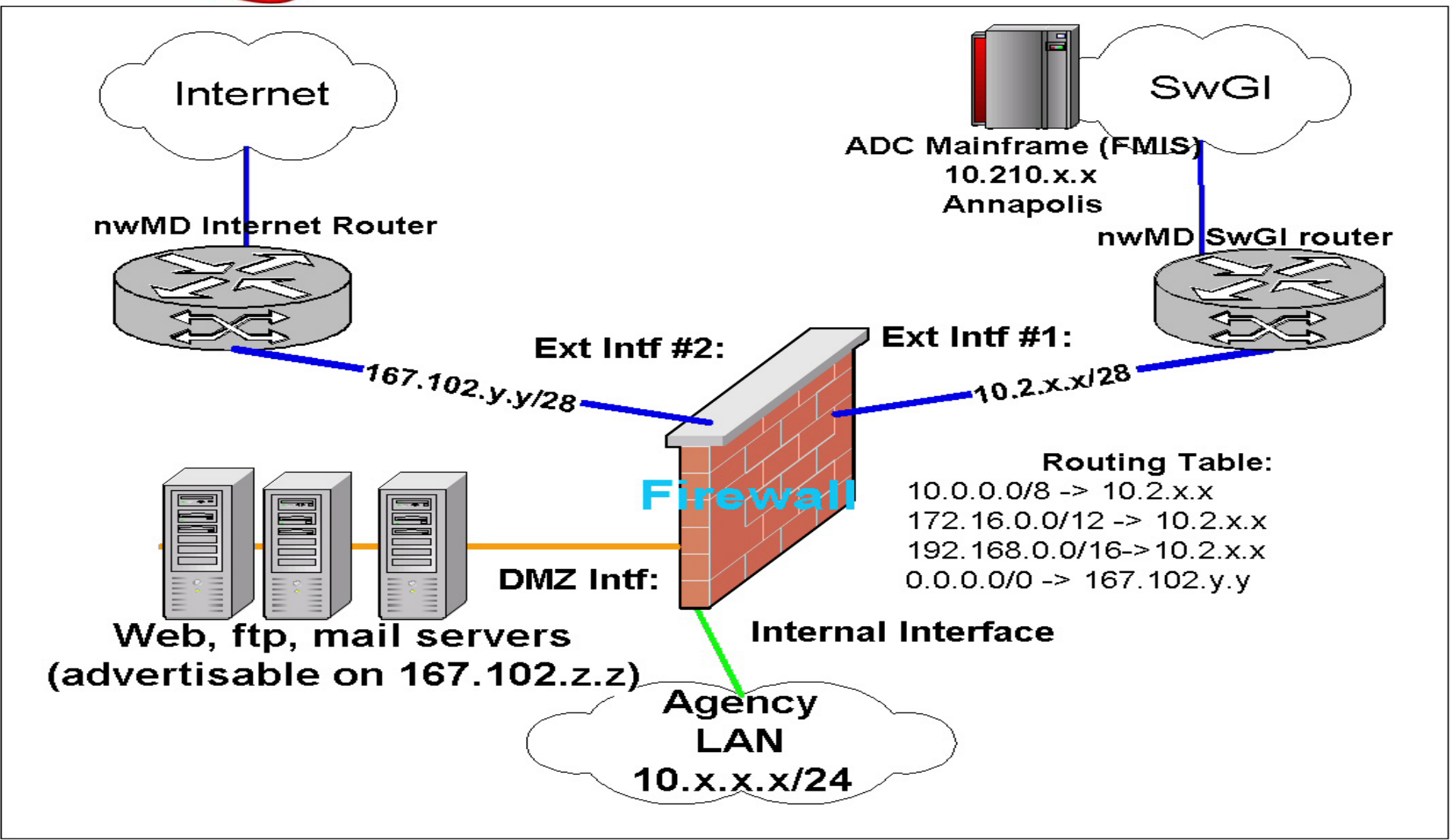
Statewide Government Intranet (SwGI)
Purpose: Inter-agency communications



Justifications for a Firewall

- Protect Internal network from the Internet and other SwGI participants
- Various forms of attacks: Denial of Service, viruses, and worms
- Provides the entity the ability to better utilize network address pool via NAT and PAT
- Secure service offerings via the use of a DMZ (Mail, FTP, and Web servers)

Sample Agency Firewall Setup

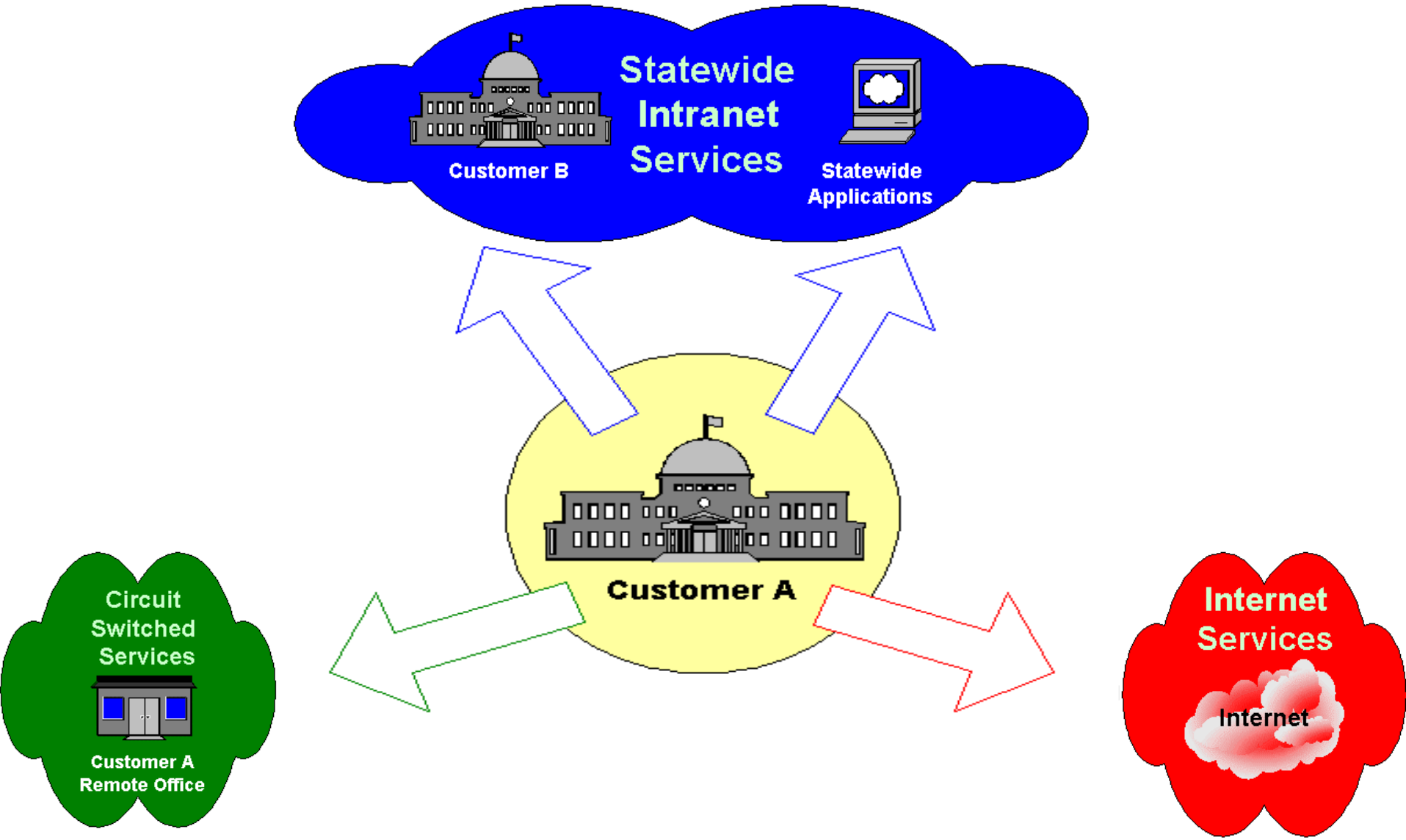


Justifications for a Screening Router

- Also known as: Perimeter Router, Access Router
- Function – Screen Packets (up to Layer 4/Transport) in an out of a network
- First line of defense in a layered security model
- Recommended for customers wanting to implement multiple firewalls or VPN Concentrators
- Able to prevent DDoS attacks by enabling strict rate-limiting parameters and preventing rogue outbound traffic
- Implemented by various nwMD customers already

Disaster Recovery

- Create an agency mini-PoP in networkMaryland Collocation space in College Park
- Create redundant paths utilizing networkMaryland
- Create two PVC's from each remote site into diverse network equipment for hardware redundancy
- Connect to a commercial provider via networkMaryland (Example: SunGard)
- Utilize Microwave technology as a redundant path to Verizon services
- Long-term goal: State-wide Disaster Recovery Site


Statewide
Intranet
Services
Customer B
Statewide
Applications
Customer A
Circuit
Switched
Services
Customer A
Remote Office
Internet
Services
Internet

Questions???

For more information …

http://www.networkmaryland.gov

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